



THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Applicant:

Yuegang Zhang

Serial No.: 10/761,575

Filed: January 21, 2004

For: End Functionalization  
of Carbon Nanotubes

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Art Unit: 2813

Examiner: Thanhha S. Pham

Atty Docket: ITL.1076US  
(P18261)

Assignee: Intel Corporation

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Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**REPLY BRIEF**

In reply to the new arguments made by the Examiner under the heading (10) Response to Argument, the following Reply Brief is provided.

Concerning claim 17, the Answer continues to ignore language in the claim and misapply other language. For example, with respect to element (a) on page 7 of the Answer, the Examiner never addresses the language "with attached functional groups." A thing that is functional is not functionalized and, even if it were, it cannot possibly have attached functional groups. The rejection ignores "attached functional groups" and "functionalized" is contorted into "functional."

In other words, the claim calls for functionalized ends with attached functional groups. This whole phrase gets transformed into a requirement that something be functional. But "functionalized" and "functional" do not mean the same thing and "with attached functional groups" cannot be read out of the claim.

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*Cynthia L. Hayden*  
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For example, "functional," according to the normal dictionary definition, is defined to be connected with or being a function, whereas "functionalized" is to cause to be functional. Thus, even giving the non-technical definition of "functionalized ends," it still requires that the ends cause a function to occur, not just that they have some function. They must be somehow adapted to cause a function to occur. Just being ends is not good enough. Moreover, the ends have to have attached functional groups. "Functional groups" is a well known term in chemistry that means that it must have reactive groups on the end.

The suggestion that the source and drain are functional groups makes no sense. No one ever calls a source and a drain a functional group and such an appellation is meaningless and an attempt to force fit the rejection. The suggestion that they are functional groups because they are simply ends and the ends are part of the source/drain function simply reads out "functionalized" and "attached functional groups."

Moreover, in Nihey the ends do not even act as the source and drains as asserted by the Examiner at the top of page 8. The source and drain is supplied by the elements 3 and 4. The ends of the carbon nanotubes have no such function and have no function distinct from the rest of the carbon nanotubes. As is made explicit in paragraph 35 of Nihey, the gate electrode is made up of the carbon nanotubes. Thus, the ends of the carbon nanotubes are part of the gate electrode, not the source and drain. The elements 3 and 4 are the source and drain, as explained in paragraph 36 of Nihey. The ends of the carbon nanotubes in Nihey are never functionalized and have nothing that could remotely be called attached functional groups. The rejection is without any basis whatsoever and takes "broadest reasonable interpretation" and stretches it beyond reason and well beyond common sense.

With respect to claim 23 and the rationale to combine, a better example of the application of hindsight reasoning is hard to image. Below the arrow at the bottom of page 8, the Examiner argues that the rationale to combine can come from the Applicant's own teaching of using open ended carbon nanotubes. Certainly, a long range of Federal Circuit and Supreme Court cases would have to be reversed for such a set of reasoning to be sustained. Moreover, the Examiner's statements of personal view are inappropriate in the rejection since the U.S. patent system requires an objective standard for a rejection. The Examiner's view cannot substitute for the lack of any teaching in the art. Statements of "convenience" and "known materials" fail to make out a

*prima facie* rejection. The rejection is plainly non-statutory and should be reversed. Every material is known and subjectively "convenient" for a motivated Examiner.

The attempt to add another reference (Pfefferle) at this late date to the rejection of claim 23 is improper. Certainly, the Examiner has the option to withdraw the final rejection in an attempt to pose new rejections. Thus, the rejection of claim 23 should be reversed.

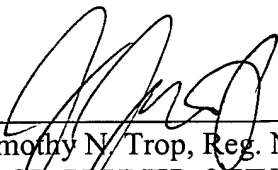
For the same reasons, the rejection of claim 28 should be reversed. In particular, claim 28 calls for different functional groups attached on opposed ends. There are no functional groups attached to the opposed ends in the reference and the attempt to suggest that the source and drain are different functional groups when they are the exact same material is, again, straining the rules of patent construction beyond any common sense.

For the Examiner's position to be sustained, "different" simply has to be read out of the claims, in addition to "functional groups." The Examiner fails to even attempt to suggest any rationale under which a source and a drain could be called a functional group.

Since the rejection is wholly non-statutory, illogical, and without support, it should be reversed.

Respectfully submitted,

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